whether it be a subperiosteal or central sarcoma. This necessitates an amputation of the lower part of the thigh in case the tibia or fibula is the seat of the neoplasm. It necessitates an amputation of the hip-joint when the tumor is subperiosteal, and involves the shaft of the femur. In view of the great mortality of hip-joint amputation, a possible exception might be made in case of a central sarcoma of the condyle of the femur which was recognized early, and which was small in size. By amputation in the lower third of the femur in sarcoma of one of the bones of the legs, the popliteal glands are thus removed, and while this point would concern us more if the disease were cancer, yet I have seen a case of sarcoma affecting those glands.

The remedy of amputation which is suggested, is a severe one; but the disease for which the amputation is performed is a uniformly fatal one if left to nature, and in view of the great malignancy of sarcoma, I believe the operation should be the most radical one consistent with a due regard for the life of the patient during the immediate performance of the operation. It must be remembered that the patient is suffering from a uniformly fatal disease, and the chances of escape from it are in proportion, within proper limits, of course, to the distance at which the limb is removed from the seat of the malignant tumor. Finally, I trust that I have been sufficiently clear upon the following points:

1. The importance of early recognizing the disease and the necessity of complete removal of the limb, including the entire bone affected, by amputation without delay.

2. The importance of carefully watching the subsequent history of patients upon whom an operation has been performed for the removal of sarcoma.

3. The importance of a microscopic examination of every sarcoma. Surgeons are of one opinion upon this point, that a microscopic examination is a *sine qua non* to insure the tabulation of a case for purposes of study.

4. The importance of a radical operation in these cases of malignant sarcomata affecting the long bones of the extremities, and the condemnation of partial enucleations and the use of caustics and plasters.

5. The importance of encouragement to patients suffering from malignant disease of the long bones, on the ground that early and radical operations, even in the most malignant cases, may result in perfect cure.

6. *Carcinoma of the Skin.*—I am unable to find any satisfactory reports of permanent cures in carcinoma of the skin. My cases number 19 in which there was a permanent cure, the shortest time being five years, and the longest twenty-one years. In this group is included a case of carcinoma of the ileum and cecum with resection of six inches of the bowel and a subsequent anastomosis with a Murphy button. It is now nearly four years since the operation and the patient is well and at work.

7. *Carcinoma of the Breast.*—My cases number 20 in which a permanent cure has taken place; the shortest period is four years and the longest thirteen years. Each one of these 20 cases is alive to-day and with no return, or recurrences, or metastases.

The result of the treatment by surgical interference shows, therefore, that these 20 cases have been permanently cured, and no other method or plan of treatment can furnish 20 cases that have been subjected to the test of so many years of immunity.

If now the 6 cases of sarcoma of the breast, of which mention has been made, be added to the 20 cases of cancer of the breast, there are 26 cases of malignant disease of the breast cured by surgical operation, the shortest period being four years and the longest twenty-two years.

CARCINOMA OF THE CECUM.

WITH REPORT OF CASES IN WHICH THE CECUM WAS REMOVED FOR MALIGNANT DISEASE.*

WILLIAM J. MAYO, A.M., M.D.
SURGEON TO ST. MARY'S HOSPITAL.
ROCHESTER, MINN.

Ileocecal carcinoma is not an infrequent malady. Ewald in a collection of 1148 cases of intestinal cancer found 64 in the cecum and 26 in the ileum, and more than half of the latter involved the ileocecal valves. Sutton says that of 100 cases of intestinal carcinoma 75 will involve the rectum, 23 the large intestine and but 2 the small bowel. Frank's table shows that two-thirds of all cancers of the large bowel involve the cecum and sigmoid flexure, and in about equal proportion. From these statistics it can be estimated that 7 per cent. of all malignant diseases of the bowel involve the cecum. Sex does not seem to have much significance. The average age of cases of carcinoma of this organ is somewhat younger than malignant disease in other parts of the body, and while not frequently found in the young it is sufficiently common to warn us against laying too much stress on the years of the patient.

Among the most frequent of the attributed causes is constipation, but if this is an important etiologic factor it would seem that the disease would affect females more often than males; yet this is not the fact. Maylard states that primary carcinoma of the intestine is always of the columnar-cell variety and Furnival points out the frequency of colloidal changes, particularly in the young. Lymphatic infection is found in less than one-half of the cases dying from intestinal carcinoma. Haussman, in 112 collected autopsies, found that 55 were limited to the gut, the remainder showing lymphatic involvement in 36 cases and in 21 cases general infection. More than one growth is seldom discovered, although two or more points of disease have been reported; whether all were primary or from a single source of infection and carried to the situations found by implantation or arterial emboli it is impossible to state.

The disease most frequently originates at the ileocecal juncture and has the usual tendency of all carcinomata of the large bowel to form a ring-like constriction, although a considerable tumor may exist without obstruction. The duration may be very prolonged and its course before active obstruction supervenes is usually slow. Briddon reports a case of twelve years' probable existence. Death usually results from obstruction or perforation, the latter either just above the stricture and close to it, or at some point in the cecum from distension; perforation is somewhat more frequent (7 to 4).

The distension ulcer in the cecum is similar in pathology to the distension ulcers in the small intestine about which Kocker has written so interestingly. The symptoms of malignant disease of the cecum are colicky pains, constipation alternating with diarrhea and progressive wasting. A tumor may be felt in some cases.

* Read at the Fifty-second Annual Meeting of the American Medical Association, in the Section on Surgery and Anatomy, and approved for publication by the Executive Committee of the Section: Drs. W. J. Mayo, H. O. Walker, and A. J. Ochsner.

In the later stage intestinal peristalsis can be plainly seen through the attenuated abdominal walls and is usually accompanied by marked gurgling. Other cases present symptoms of chronic appendicitis with an induration indicating a small inflammatory deposit about the appendix. This was true of two of our cases. As the obstructed material is largely accumulated in the small bowel, symptoms of gastro-intestinal irritation are more marked than if the large bowel only was involved. A few cases are ushered in without premonitory symptoms by an attack of acute obstruction. König, Korte, Barton and others report cases in which an acute intussusception was the first sign of trouble.

The differential diagnosis between malignant stricture of the cecum and simple or tuberculous strictures may be impossible without exploration. In a paper on "Localized Tuberculosis of the Intestine" read before the Minnesota Academy of Medicine, Feb. 1, 1899, I reported three cases of tuberculosis of the cecum, and I have met with one additional case since that time. In these cases the foul discharges from the bowels, slight but constant temperature, tendency of the tuberculous mass to soften, taken into consideration with the previous history made a diagnosis possible, although the obstructive phenomena were essentially the same.

Cases of chronic inflammatory thickening of the cecum have been reported giving much the same signs and are in some cases, at least, syphilitic in origin. Impactation of feces in the cecum is not so very infrequent and may remain months, if not years, without dislodgement. In one case which I examined in an inmate of the Rochester State Hospital for the Insane, some twelve years ago, such an impactation was known to have been present for several years and finally by atrophy necrosis ulcerated to the surface of the body. Dermoid or other tumors of the abdominal muscles on the right side may confuse the diagnosis. In the one case of dermoid which I have seen the differentiation was most difficult. Dermoids are very rare and usually occur in the female following a labor. There is no history of intestinal obstruction.

Acute obstruction of the bowels is a frequent complication of the malignant process and its relief a prerequisite to a successful outcome. Treves, speaking of intestinal obstruction generally, says that he reduced his mortality 50 per cent. by relieving the distended intestine above the obstruction. This has been done by a simple incision or aspiration (Grieg Smith) or the use of Paul's tubes. The common method of relief has been that of forming a temporary artificial anus and in the large intestine necessarily in this manner. In such cases three operations are demanded: 1, relief of the obstruction by the artificial anus; 2, resection of the diseased area, and 3, closure of the anus, and this last has a mortality of its own. Makin collected 39 intestinal resections for the closure of an artificial anus —21 were cured, 3 uncured and 15 died.

From an operative standpoint the ileocecal coil should be independently considered. In cancerous or other obstruction of either the large or small bowel the normal condition above and below the disease is identical, but in this situation the small bowel empties its contents in a fluid state into the large intestine, in which the feces assume solid form. The question is not one of ordinary intestinal union in which two parts of similar bowel are joined, but one in which by reason of the dissimilarity an anastomosis can be effected under very favorable circumstances.

In ileocecal obstruction, the ileum can be readily joined laterally with the transverse colon. The obstructed intestinal contents are fluid and do not endanger the union as is the case with the solid accumulations in the large bowel, and the size of the receiving intestine and its nearness to the anal orifice gives it all of the advantages of an artificial anus on the surface of the body. The union can be effected at a point sufficiently high on the ileum to secure healthy bowel for approximation. There is also the great advantage in that the communication is permanent. The extirpation when performed later is more easily effected, both ends of the intestine being turned in and closed. We have performed ileocolostomy for various causes six times, in this manner, using the Murphy button, and all recovered from the operation. In four of these cases nothing was attempted in a radical way on the diseased part, the discharges draining satisfactorily from either side of the obstruction. Exclusion of a portion of the intestine can be safely accomplished provided there is some exit for the secretions of the excluded part, but, as shown by the studies of Kammerer, if the exclusion is absolute future trouble can be expected.

Resection of the cecum was first performed by Billroth in 1876, and the operation has now been done many times and a large number of cases have been reported. The operative mortality as given by Grieg Smith was between 30 and 40 per cent. Furnival estimates the mortality of the more recent cases as somewhat less, 20 to 25 per cent., perhaps. Butlin, in 95 reported cases involving the cecum and ascending colon, gives an operative mortality of 29 from shock and sepsis, and 66 recoveries.

Excision of the cecum for malignant disease usually requires removal of the ileocecal juncture and if the disease be not too advanced can be readily effected. The arteries are almost all terminal with but few anastomotic loops (Witherspoon) and the ligation of the blood supply does not endanger contiguous portions of the bowel. A lateral incision is most convenient. The peritoneum along the outer wall of the cecum and ascending colon is divided, the malignant portion of the bowel raised and the vessels ligated. The ascending colon is cut across, one and one-half to two inches above the upper limits of the disease, and its distal end turned in by a purse-string suture. The proximal portion, clamped to prevent leakage, is lifted out of the abdomen and when completely separated from its other attachments, the ileum is divided at a healthy point. The anastomosis is best effected, end of the ileum to the side of the ascending colon. If the ileum can not be readily brought to this portion of the colon, it can be attached to the transverse colon either end to side or side to side.

The ultimate results of excision done early are good. Van Bramaun in 14 cases had 4 free of recurrence after three years. Macewen two out of five, Wolfler two out of twelve, Czerny three out of eighteen cases. When it is considered that a number of the remaining cases were free from recurrence although less than three years, it is certain that later reports would increase the percentage of permanent cures. We have excised the cecum four times, twice for malignant disease, once for tuberculosis and once for chronic intussusception, all of the patients recovering from the operation. In the past two years we have met with five cases of cancer of the cecum. In two, extirpation of the ileocecal coil resulted in recovery, in two the extent of the disease pre-

vented a radical operation and ileocolostomy was performed for relief and in one advanced case without obstructive symptoms, the exploratory incision was closed. A brief report of the two cases in which a radical operation was performed is appended.

CASE 1.—Carcinoma of the Cecum Involving the Ileocecal Juncture. Extirpation. Recovery.

J. E. R., Yankton, S. D., American, 38 years of age. Admitted to St. Mary's Hospital, Rochester, Minn., April 4, 1899. History of colicky pains in the abdomen for four years. While not severe, the pain has been persistent; during the past year it has become located in the right side. For four months a diarrhea has been persistent and he has lost 40 pounds in weight. Family history negative.

Physical Examination.—A moderately emaciated man of cachectic appearance. No evidences of disease of organs outside of the abdomen. Temperature and pulse normal. There is considerable intestinal distension and intestinal peristalsis waves can be seen and are accompanied by marked gurgling. On deep pressure in the right side an induration can be detected, evidently connected with the cecum. It is about the size of a small lemon, firm to the touch and not very sensitive. Upon the history and physical signs the diagnosis of appendicitis seems warranted and it is thought to be tubercular in origin and the obstruction due to adhesions.

On April 6 a lateral incision revealed a nodular tumor of the cecum involving the appendix and ileocecal juncture. A few enlarged glands could be felt behind the bowel. An incision through the peritoneum was made on the outer side and the cecum with the enlarged glands was lifted out of the abdomen. The vessels supplying the part were ligated with catgut. The ascending colon was divided two and one-half inches from the tumor and its distal end closed with a circular suture. The proximal end was clamped. The mesentery was progressively ligated and the ileum divided eight inches above the ileocecal valve. An attempt was made to join the end of the ileum to the side of the ascending colon but there was some tension, the divided end was therefore turned in with a circular suture. The omentum was raised and the side of the ileum six inches above its severed extremity was anastomosed to the transverse colon near the hepatic flexure with a Murphy button. A small drain was introduced into the right side and the incision closed. Recovery was uneventful. The patient was discharged May 3, 1899. He rapidly regained his usual weight and strength and is now pursuing his work in better health than for years before. Microscopic examination showed only inflammatory changes.

CASE 2.—Carcinoma of the Cecum, Involving the Ileocecal Juncture. Extirpation. Recovery.

A. C. S., Maiden Rock, Wis., Scandinavian, 30 years of age. By occupation a fisherman on the Mississippi river. Admitted to St. Mary's Hospital, Jan. 6, 1901, with the following history:

For the past six months has suffered from cramps in the abdomen with a feeling of weakness. For the last three months the pain has been nearly constant in the right side, losing weight and strength, constipated. Family history good.

Physical Examination.—A man of good physique, somewhat emaciated, walks with the right thigh drawn up to relax the psoas and iliacus muscles. Temperature and pulse normal. No evidences of disease outside the abdomen. There is some tympanites. On deep pressure in the right side a small mass can be detected which is tender to the touch. A diagnosis of chronic appendicitis was made.

January 8, an intermuscular incision (McBurney) was made and a tumor involving the cecum, appendix and lower ileum was exposed. The incision was lengthened, cross cutting the deeper muscles. The peritoneum was divided outside and the cecum, appendix, ascending colon and fourteen inches of the ileum was excised, a lateral anastomosis between the lower ileum and transverse colon being effected. There was extensive adhesion posteriorly in the mesentery necessitating the extensive resection. A few small glands were found. A small drain was introduced and the incision closed. Patient discharged February 27 in good condition. The microscopic examination of the glands removed showed only inflammatory changes.

In conclusion, I would urge that every operating surgeon be prepared to excise the cecum. The early symptom may be such as to lead to the belief that an appendicitis exists and in this way a timely operation for a malignant process may result in a complete cure.

DISCUSSION IN SYMPOSIUM ON THE SURGICAL ASPECT OF CARCINOMA.*

DR. A. C. BERNAYS, St. Louis—From what has been shown here we are to face an endemic of cancer. The exact figures, as Dr. Dennis read them, I do not remember, but there is undoubtedly now an endemic of cancer which we have recognized, because it has increased largely in recent years. This endemic seems to affect all classes. The question is: Will it be possible by united, collective effort to bring help, as we have done in other diseases, which we have attacked collectively in our professional efforts? Dare we hope for a curative remedy? I think not. Let us be modest. We dare to believe that by collective investigation, such as we have made in other pathologic conditions, we may gain accurate knowledge regarding the location, frequency and geographical distribution of cancer, also its mortality and length of life of patients afflicted. Upon that basis we dare hope that we may be able to exercise a sort of prophylaxis, as we now do in tuberculosis; we may confidently expect this much. But even this result will depend largely upon the success of our efforts in discovering the nature of cancer. Many men have worked upon this question. All have failed to solve the problem. I believe that only a few cases will furnish material which will be useful in our research for the parasite. I believe that not all cases of what we call cancer now—and I wish to emphasize that point here—are due to parasitic infection; some cases are undoubtedly degenerative processes, necrobiotic processes of tumors or growths developed on the basis of rudimentary tissues which we have inherited from an infinitely long line of ancestral forms of life. What we call cancer, or what we call malignant disease, consists of many different things, and the investigations, which I think will be pressed and enthusiastically continued, will show that under the head of "cancer" some quite different things are included; some undoubtedly of parasitic nature and others of embryonal or rudimentary and developmental nature. If the discoveries and conclusions of the New York investigators, under the direction of Dr. Park, are based on careful observations, they will soon be corroborated by the researches in laboratories all over the planet.

A few words on resection of the cecum. About two months ago I had an opportunity to resect a cecum in a case of cancer. I will relate it as briefly as I can, and then make a sketch of the operation. The patient was a man aged 54, who had been sent to me for operation by a good physician, with the diagnosis of chronic appendicitis. I felt a hard nodule in the right iliac fossa, but was unable positively to make a diagnosis of chronic appendicitis; nor was I able to come to the positive conclusion that there was a cancer of the caput coli, or ileo-cecal valve, as it proved to be. Deciding to operate, I opened the abdomen and found a large lump, consisting of glands; the meso-colon and the mesentery were normal. There were only a few small glands. I used the Kocher clamp and clamped off the gut and the ileum by clamping at right angles. By closing it tightly I was enabled to cut away this whole mass, and, putting my hand under it, to lift it up from the iliac "shovel." This was accomplished with scarcely any bleeding, perhaps a little from the surface from which I lifted up the mass. There was only one large artery coming down, which was tied. The ileum fortunately had a long mesentery and it was freely movable and the colon also could be turned well out of the wound. I intended to close up this hole by simply inverting the whole thickness of the bowel and closing it with a few catgut sutures, but, at that moment, it struck me

* Papers by Drs. Park and Powers published Sept. 14, 1901; Drs. Weir and Senn, Sept. 28, 1901.

that the better plan would be the Maunsell operation, inasmuch as I had here a large hole in the cecum. So I introduced a pair of forceps, bringing this piece of gut up; at this point I made an incision in the cecum, and by means of a pair of forceps brought this piece of gut together with the cecum. I was then enabled, in the very simplest manner, to sew together, just as Dr. Weir did in the resection of the rectum; I sewed the gut into the cecum by through-and-through sutures, then simply drew it out, and then put on some Lembert sutures on the outside all around, and finally closed this opening here with Lembert stitches. That finished the operation. I think you will have to admit that that method is simpler than any other method, and restores almost to the normal condition after the resection of the cecum.

DR. G. W. CRILE, Cleveland—I wish to briefly describe a method of controlling hemorrhage in operations for malignant disease of the tongue. A small screw clamp with parallel blades, protected by small pieces of rubber tubing, may be placed upon the common carotid arteries and so adjusted by the screw as to close the lumen of the vessel, thus rendering the field bloodless.

DR. W. L. RODMAN, Philadelphia—I think we are all beginning to feel that there is an accumulating amount of evidence that carcinoma is due to parasitic disease. Certain things indicate that it is due to a parasite. The very fact of its encroachment would indicate that it could not be anything but a germ. We know that carcinoma, until recently, was not a disease frequently found among the Indians and negroes, and yet, at the present time, it is practically found in both races; carcinoma of the breast in the negro is probably more common than in the white. This change must be due to a germ, and, once having started, it is likely to continue and increase. Dr. Dennis raised a very important question when he said that he had not seen a case of sarcoma of the jaw recover. In a discussion not long since, in the Philadelphia County Society, rather the opposite position was taken with regard to sarcoma of the jaw. It was held that an operation that is radical and done early is more likely to prove successful than sarcoma in any other part of the body; a very good reason was given for it at that time, viz., the fact that the mouth is a septic cavity and that suppuration results after an operation. This explains why more cures are reported on the upper and lower jaws than sarcoma in other parts of the body. I know of a case of sarcoma of the lower jaw fourteen years after operation and the upper jaw two years after operation. I fully agree with the position taken by Dr. Powers that we should cut into a tumor for diagnostic purposes; it is not only justifiable, but the best course that one can take. The little risk incurred in doing this is more than justified by the fact that it is hardly fair needlessly to remove the mammary gland of a child-bearing woman.

DR. GUSTAV FÜTTERER, Chicago—While I do not intend to discourage research in that direction, I wish to state that I have never been able to believe that parasites are or may be the cause of carcinoma. Probably the strongest reason against a parasitic cause lies in the fact that in carcinomatous metastasis the cells of the organ invaded do not become infected, and do not participate in the building up of the metastasis, which develops from the invading cells. I have first advanced this reason at a meeting of the Chicago Pathological Society, Dec. 14, 1896, and I still consider this fact of the highest importance; it is hard to conceive that such would be the case if the invading cells included parasites.

I have always adhered to Virchow's theory of irritation, and after all that I have seen, I take a firmer stand on this than ever. Friction causes no real inherent malignancy of the epithelial cells, but only an apparent malignancy. It is none other than can be explained by a greater supply of blood that is not regulated with even nearly the almost mathematical correctness which governs the nutrition of the epithelial apparatus under normal conditions. So while I do not believe in an inherent malignancy of carcinoma cells, I do believe that normal epithelial cells, through continued circulatory disturbances, become trained to indure and prosper by a condition of hypernutrition. Hand in hand with sprouting blood vessels surrounding them, the epithelial cells may invade the deeper tissues, the resistance of which has either been lessened by chronic circulatory disturbances, particularly edema, or by a reduction of the volume of blood in old age. Then they may proliferate in the deeper tissues making metastasis and causing cachexia. It may be cachexia of a different kind, as the cells retain their physiologic function more or less, according to local conditions, overloading the circulation with physiologic products. This alone will explain the different forms of cachexia, such as we find them, for instance, with carcinoma of the stomach, primary carcinoma of the liver, etc.

DR. G. B. MASSEY, Philadelphia—The last remark made by the speaker seems to me to be capable of being answered by objections against the autocytic theory, which would be evident to the biologist. For to adopt the autocytic theory of cancer we must assume that cells can change their character. We must assume that cells that have been generated as tissue cells, with a benign course or history, can suddenly, for some unknown reason, entirely change their character. No one can watch these growths for any length of time without feeling sure that there is a separate entity in that growth from the entity in the host, that there is an entity there, a separate entity, totally distinct from the man or woman on which it feeds. I wish simply to make the point that the very evident parasitic nature of cancer should attract more attention from the profession to an antiparasitic method which was brought to the attention of the Section on Practice of Medicine of this Association, at its meeting in 1897, by myself. That is a method by which the electric current is used to cause a chemical disintegration of a growth at once under ether, together with the production of a surrounding zone of sterilization; it produces a zone from an inch and a half to two inches in extent beyond where all tissues are destroyed and beyond where the demarcation commences. In this zone the physician may feel assured that a large proportion, if not all of the germs—by improved technic—may be killed without destruction of the normal tissue cells. This method has been tried in my hands in 42 cases, and I maintain that it is time for one or two other men also to try it. These 42 cases were brought mostly by physicians, most of them having been previously operated on by the knife, 23 of them died of metastases in spite of what I did, the metastases originating prior to the application. Nevertheless, 15 out of the 42 cases are living, and the great bulk of the 15 cures are of more than two years' standing; in several 7 years have elapsed since the application, and in others 5 years, without recurrence.

DR. R. H. M. DAWBARN, New York—I desire to express my cordial approval of Dr. Bloodgood's advice in favor of the most radical insistence upon extirpation of all tumors, all lumps in the breast of whatever kind. In a great many instances our patients will veto the suggestion, but that does not prevent our duty of proper advice in the case. I have been making a special study of malignant work, especially about the mouth, the regions supplied with blood by the external carotid, and next autumn I shall publish a list of about forty personal operations of that nature. Regarding the operation for cancer of the tongue: 1. The chief cause of death is shock. One chief cause of shock, as we all know, is hemorrhage. There is nothing I am more certain of—differing from Dr. Christian Fenger in this regard—than the wisdom of ligating the external carotid in every case, prior to a complete extirpation of one-half or of the whole tongue. This ligation can be done in five minutes; and, thanks to the early work of Dr. Wyeth, we now know that it is done with great safety; it makes the work done subsequently practically bloodless. We do not, then, need to do a preliminary tracheotomy. 2. If the patient does not die then, but later, what will the cause be generally? It will be sepsis, particularly that of a pneumonic nature, and due to entry of septic discharges from the mouth into the air passages. Apropos of that, I think it is wise to rub the raw surfaces in the mouth with aristol at once. If we adopt that plan, we will have surfaces that will not offensively slough. I do not pack the floor of the mouth with gauze; instead of

packing, I use very frequent irrigation with a fountain syringe. We all know that a considerable percentage of cases of tongue excision die of sepsis. I have lost several myself in my early work from septic pneumonia; these I feel sure that I could now save. The chief cause of death was the position of the patient *post operationem*. In the "International Text-Book of Surgery," in an article on this subject, there is a bit of advice which seems really dangerous; it is that as early as possible patients from whom the tongue has been excised shall be allowed to sit up. On the contrary, I know that they should always be put with the head lower than the foot of the bed, and kept there so long as there is a sloughing condition of the mouth, lest the foul saliva gravitating down the air-passages cause a "schluct-pneumonic." When there is a healthy, odorless, granulation surface, and when control of the stump of the tongue in the act of swallowing is regained, so that coughing does not show that food or drink is passing "the wrong way," then, and not before, it is wise to let the patient's head be elevated—even though this require weeks or longer. In conclusion, let me allude to a point heretofore neglected by operators, but as I believe unwisely. When just a little of the base of the tongue can safely be left attached to the hyoid bone, it is most important that this stump gain power to resume its function of closing down the epiglottis over the larynx in the act of deglutition. I do not know of any text-book that advises what I have practiced, namely, to save the long stump of the healthy twelfth (hypoglossal) nerve, making a little slit in the remainder of the intrinsic muscle of the tongue and sewing with fine catgut into this cut the end of the twelfth nerve—so that this motor nerve may, in time, control the muscle. I have felt encouraged to continue this point in the technic of the operation.

Dr. A. H. Levings, Milwaukee—I desire to call attention to one of the conclusions made in the classic paper by Dr. Senn, namely, regarding the development of carcinoma from epithelial cells. It was stated that all carcinomatous growths were the result of an atypical proliferation of epithelial cells from a matrix of embryonic cells, of congenital or post-natal origin. In the discussion, I desire to call attention very briefly to the histology and embryology of the enamel organ of the teeth. The enamel of the tooth is epiblastic in origin and comes from the epithelial structures lining the mucous membrane of the mouth. If we consider the embryology we find that at about the end of the second month of fetal life a proliferation of the epithelial cells in the form of a half circle and situated directly over the maxillary bones takes place. This growth of epithelial cells dips down as a solid wall into the deeper tissues beneath, or into the mesoblast. From this wall numerous pillars are given off, one for each of the deciduous and permanent teeth. The ends of these pillars become bulbous, forming the enamel of the teeth and enclosing the papillæ. During the fourth or fifth month of fetal life the tooth follicle, made up of connective tissue, encloses the enamel, cutting it off from the above-mentioned pillar. We have then within the mesoblast not only a solid wall of epithelial, embryonal cells skirting the entire area of the jaw, but also some twenty-six columns of cells given off from this wall and projecting into the still deeper tissue. This entire mass of embryonal cells has no further function and is either in part absorbed, or remains dormant and sequestered within the tissue as functionless cell nests. There is no other portion of the body in which there are anything like the same number of dormant, useless, embryonal cells sequestered within the tissues, as occurs within the jaws. It is a well-known fact that epithelial tumors, either cystic or solid, taking origin from these sequestered cells are among the rarest of pathologic curiosities. Up to the present time probably less than a half dozen, and as far as I am aware, but four have been reported. It would be a curious fact were the Remak-Cohnheim theory of the production of tumors correct in all cases, that here in the jaws where these embryonal, sequestered cells are so abundant that epithelial tumors are so infrequent. In so far as my investigation extends I am unable to satisfy myself that the Remak-Cohnheim theory of the causation of tumors is applicable to more than a small proportion of the whole.

Dr. K. A. J. MacKenzie, Portland, Oregon—The weight of evidence from the standpoint of the investigator is strongly in favor of the parasitic theory and this evidence is very strongly enforced by the clinical facts. The concurrent testimony of other investigators in foreign countries who have followed up this line of research is very significant, and the recent work of Leopold, Plimmer, and others affords apparent corroboration of the present work of Park and Gaylord. In considering the clinical evidence one is impressed with the frequency with which the disease develops in regions where there are departures from the normal, anatomic, and physiologic standards. Witness the frequency, for instance, with which the disease develops in such exposed points as the lip, tongue, breast, penis, angle of the eye, skin, chronic ulcers and cicatrices, etc., these facts being very strongly suggestive of an infection introduced from without and not acting from within the body. Within the body we find a strong analogy when we consider that the disease develops at points where the local conditions favor first irritation and subsequently infection. The pylorus, the stomach, the hepatic and splenic flexures, the rectum, the gall tracts, the pancreas, the bladder, etc., all bearing testimony to the topical tendencies of this disease and to an infective process. So apparent is the fact that the inference is just, that the development of carcinoma always predicates, 1, a departure from the anatomic or physiologic standards of the parts and 2, an infection. By parity of reasoning the hope of successful treatment must largely rest in prevention, in the early recognition of all disordered physiologic and anatomic states and their timely correction.

Dr. C. A. Powers, Denver—Dr. Bloodgood spoke of the relative frequency of breast tumors at the Johns Hopkins Hospital, giving, as I remember, a proportion of 426 cases out of 12,000 admissions, or over 3 per cent. of all admissions to the hospital. Possibly such a high ratio may be explained by the fact that the work done there on the breast has attracted to that clinic an unusually large number of breast cases. I think 3 per cent. would be much too high for us to expect as an average. Dr. Weir's operation for cancer of the rectum seems to be an admirable one; thorough, permitting an excellent inspection of the parts, with good control of hemorrhage, and offering a better chance of cure than the Kraske operation. Kraske himself says that most cases of carcinoma of the rectum have a high seat. I fail to understand from Dr. Weir whether the upper fragment comes down easily. In the Kraske operation we find a great deal of difficulty in bringing down the distal end of the upper fragment. It has been my fortune to do five Kraskes, and I look upon it, as we all must, as a dangerous operation. I think it one of the severe operations in surgery; certainly in the hands of the best operators it has a mortality of not less than 20 or 25 per cent.

Dr. W. J. Mayo, Rochester, Minn., in closing—My object in preparing this paper was not to present anything new. The frequency with which operations for appendicitis are now being done, and the evidences that would induce us to operate on cases of appendicitis will lead to many early operations for carcinoma of the cecum, and we should be prepared for that. The two cases in which I succeeded—I believe in securing ultimately successful results—were both induced by a diagnosis of appendicitis. All who operate with that diagnosis ought to prepare themselves for excision of the cecum.

The Blind as Masseurs.—E. Eggebrecht of Leipsic has trained four blind women and nine blind men in the science of massage, and describes his methods and the technique in the *Ztft. f. Diät. u. Phys. Therapie*, V, 2. He believes that it is the duty of physicians to encourage this employment for the blind, not on account of pity for their misfortune, but because they are so exceptionally endowed for it by the development of their sense of touch. A writer in the *Wiener Klin. Woch.* states that the majority of physicians in Austria entirely disapprove of massage by the laity, and consider it incumbent on them to refer patients for massage to young colleagues just entering practice and waiting for clients.